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The American FERTILIZER

Vol. 107 AUGUST 9, 1947 No. 3

Development and Use of Fertilizer Materials in Relation to Higher Analysis Mixtures*

By K. D. JACOB[1]

AT THE turn of the century the commonly used fertilizer materials were generally low in analysis, costs per unit of plant food were high, and, with the exception of superphosphate and by-product ammonium sulphate, chemically processed products were virtually unknown. Subsequently, however, old processes and products have been much improved, new processes and materials of considerably higher analysis have been developed, the wholesale cost of plant food has been sharply reduced, and the manufacture of chemically processed fertilizer materials has expanded greatly. This progress has resulted from the combined efforts of governmental and private agencies.

The developments in fertilizer materials have been reflected in the production of higher analysis mixtures and in the lowering of the cost of plant food to the farmer. There is still, however, great opportunity for narrowing the gap between the materials and the mixtures with respect to both the concentration and the retail cost of fertilizers. The importance of the problem is emphasized by the fact that mixtures account for about 65 per cent of the total fertilizer tonnage.

It is the purpose of this paper to review the developments in plant-food consumption and mixed-fertilizer concentration; to discuss the trends in concentration, cost, production, and use of fertilizer materials; to indicate the relation between the concentration of mixed fertilizers and the cost of plant food to the farmer; to point out the factors involved in the production of higher analysis mixtures, and to indicate concentration goals for mixed fertilizers which should be possible of attainment within the next few years.

Plant-Food Consumption

The total consumption of plant food (N, P_2O_5, and K_2O) as commercial fertilizer in the United States and territories increased 625 per cent from 395,000 tons in 1900 to 2,863,000 tons in 1945 (Table 1).[2] The increase during the 5-year period 1940 to 1945 (62 per cent) was greater than that in any of the preceding 10-year periods beginning with 1910. Among the individual plant foods, the consumption of nitrogen in the last 45 years has increased tenfold, that of P_2O_5 nearly fivefold, and of K_2O more than sevenfold. Nitrogen, P_2O_5, and K_2O comprised, respectively, 23.7, 50.2, and 26.1 per

*A paper presented at the Beltsville Fertilizer Conference, January, 1947.

[1] Principal Chemist, Division of Soils, Fertilizers, and Irrigation, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, U. S. Department of Agriculture, Beltsville, Md. Grateful acknowledgment is made to F. W. Parker for helpful advice and suggestions, and to A. L. Mehring for assistance with the statistical data.

[2] Except as indicated otherwise, the calendar year and the 2000-pound ton are used in this paper.

cent of the plant food used in 1945. In relation to the total consumption of plant food, the trend in P_2O_5 use has been definitely downward while that of K_2O and especially of nitrogen has been upward.

It will be noted that in 1945, 71.5 per cent of the total plant food was consumed in the form of commercial mixed fertilizer, as compared to 54.5 per cent of the nitrogen, 67.7 per cent of the P_2O_5, and 94.5 per cent of the K_2O. The proportionate use of K_2O in mixtures was 51.2 per cent in 1900 and, unlike the other plant foods, the trend in such use has been definitely and markedly upward.

Mixed-Fertilizer Concentration

As shown by the data of Table 2, the total plant-food content of commercial mixed fertilizer was 55.8 per cent higher in 1945 than in 1900, while the corresponding increases for nitrogen, P_2O_5 and K_2O were 95.5, 9.5, and 200 per cent, respectively. In relation to P_2O_5, the nitrogen content increased 81 per cent and the K_2O, 167 per cent. In comparison with nitrogen, the much greater increase in the K_2O content since 1930 undoubtedly reflects, among other things, the large supply of high-analysis, low-cost potassium chloride suitable for unrestricted use in mixed fertilizers. It is worthy of note that the period in which the concentration of nitrogen in mixed fertilizers has shown the greatest increase coincides with the development and expanding use of high-analysis, low-cost, synthetic nitrogen products, particularly the ammoniating solutions.

Trends in Concentration, Cost, and Use of Fertilizer Materials

Table 3 shows the weighted average plant-food contents of the principal materials consumed as fertilizer in the United States and territories during certain years of the period 1900 to 1945. The data are based principally on the material-consumption figures reported by Mehring.[3] It will be noted that, in general, large changes have not occurred in the plant-food contents of the individual materials. On the other hand, there have been very important increases in the weighted average concentrations of the three groups of

[3] Mehring, A. L., "The Magnesium Content of Fertilizers, 1850–1937," Com. Fertilizer Yearbook, *1939*, 32–41. "The Magnesium Content of Fertilizers, 1938–1945," presented before the Division of Fertilizer Chemistry, American Chemical Society, 110th Meeting, Chicago, Ill.

TABLE 1

CONSUMPTION OF PLANT FOOD AS FERTILIZER IN THE UNITED STATES AND TERRITORIES

PLANT FOOD[1]	CALENDAR YEAR 1900	1910	1920	1930	1940	1945
Nitrogen:						
Quantity, 1,000 short tons	62.0	145.9	227.8	376.6	419.1	679.0
Portion of total plant food, %	15.7	17.0	19.9	24.7	23.7	23.7
Portion used in commercial mixed fertilizers, %	57.1	49.5	41.0	46.2	49.5	54.5
Relation to consumption in 1900, %	100	235	367	608	676	1,095
P_2O_5:						
Quantity, 1,000 short tons	246.2	499.2	660.1	792.8	912.3	1,438.0
Portion of total plant food, %	62.4	58.3	57.6	52.1	51.7	50.2
Portion used in commercial mixed fertilizers, %	67.6	64.0	56.6	69.4	58.3	67.7
Relation to consumption in 1900, %	100	203	268	322	371	584
K_2O:						
Quantity, 1,000 short tons	86.5	211.0	257.5	353.8	435.0	746.0
Portion of total plant food, %	21.9	24.7	22.5	23.2	24.6	26.1
Portion used in commercial mixed fertilizers, %	51.2	55.4	37.9	79.4	82.4	94.5
Relation to consumption in 1900, %	100	244	298	409	503	862
Total:						
Quantity, 1,000 short tons	394.7	856.1	1,145.4	1,523.2	1,766.4	2,863.0
Portion used in commercial mixed fertilizers, %	62.4	59.4	49.3	66.0	62.1	71.5
Relation to consumption in 1900, %	100	217	290	386	448	725

[1] The total consumption (1,000 short tons) of fertilizer in the respective years was 2,730, 5,547, 7,296, 8,425, 8,656, and 14,400 (estimate).

TABLE 2

AVERAGE COMPOSITION AND PLANT-FOOD RATIO OF MIXED FERTILIZERS CONSUMED IN THE UNITED STATES AND TERRITORIES

Calendar year	Composition, % N	P_2O_5	K_2O	Total	Ratio N:P_2O_5:K_2O	Total mixed fertilizer, tons
1900	2.0	9.4	2.5	13.9	0.21:1.00:0.27	1,770,600
1910	2.1	9.3	3.4	14.8	0.23:1.00:0.37	3,437,200
1920	2.3	9.2	2.4	13.9	0.25:1.00:0.26	4,062,200
1930	3.1	9.8	5.0	17.9	0.32:1.00:0.51	5,615,907
1940	3.76	9.64	6.50	19.90	0.39:1.00:0.67	5,513,425
1945	3.91	10.29	7.45	21.65	0.38:1.00:0.72	9,457,600

materials; this is because of the proportionate increase in use of the higher analysis products. Thus, the average nitrogen content of all chemical nitrogen fertilizer materials consumed in the United States has increased steadily in the last 45 years; it was 40 per cent higher in 1945 than in 1900. In the same period the average P_2O_5 content of the principal phosphate materials consumed increased 33 per cent, as compared to an increase of 125 per cent in the K_2O content of the principal potash materials.

The wholesale prices of plant food in several materials for certain years of the period 1920 to 1945 are given in Table 4. The high prices in 1920, compared with the figures for subsequent years, reflect the effects of World War I. Since 1925 the trend in the prices of P_2O_5 and K_2O has been generally downward. Large-scale manufacture of synthetic products has been the principal factor in causing the price of chemical nitrogen to decrease to about 50 per cent of the 1925 level. As the average unit price of chemical nitrogen in 1925 was about 4.5 times that of

(Continued on page 26)

TABLE 3
WEIGHTED AVERAGE PLANT-FOOD CONTENT OF PRINCIPAL MATERIALS CONSUMED AS FERTILIZER IN THE UNITED STATES AND TERRITORIES

MATERIAL	PLANT FOOD,[1] %					
	1900	1910	1920	1930	1940	1945
Nitrogeneous Materials						
Ammonia and solutions[2]	....	....	....	46.3	38.5	39.6
Ammonium nitrate	....	....	....	....	....	32.9
Ammonium phosphates[3]	....	....	11.0	14.0	13.0	13.8
Ammonium sulphate	20.5	20.5	20.6	20.7	20.7	20.7
Calcium cyanamide	....	14.0	20.4	22.7	21.3	21.0
Sodium nitrate	15.3	15.3	15.3	15.5	16.0	16.0
Other chemical nitrogen[4]	14.0	14.0	14.5	19.0	24.5	24.4
Average chemical nitrogen	15.9	17.2	18.0	19.6	20.2	22.2
Natural organics[5]	5.1	5.5	5.7	6.7	5.3	4.5
Phosphatic Materials						
Ammonium phosphates[3]	....	....	48.0	34.0	35.0	32.1
Bone meal	23.3	23.7	24.0	25.2	23.7	24.0
Superphosphate, ordinary[6]	14.5	16.3	17.3	18.3	19.3	19.3
Superphosphate, double[6]	43.8	43.8	43.8	44.5	46.9	46.0
Average	15.1	16.8	18.0	19.1	22.0	20.2
Potassic Materials						
Kainit	12.5	13.0	13.7	14.7	....	....
Manure salts	20.2	21.3	20.6	20.9	22.7	25.2
Potassium chloride	50.2	50.2	50.2	51.7	58.3	59.5
Potassium sulphate	48.0	48.0	48.0	48.0	50.5	49.5
Sulphate of potash-magnesia	26.0	26.0	26.0	26.0	24.0	22.0
Average	23.7	23.1	22.4	33.3	54.8	53.5

[1] Either N, P_2O_5, or K_2O, according to the material classification.
[2] Anhydrous ammonia, ammonia liquor, ammonium nitrate-ammonia solutions, and urea-ammonia solutions.
[3] Includes ammonium phosphate-sulphate.
[4] Includes ammonium nitrate-limestone mixtures and solid urea.
[5] Includes bone meal, tobacco stems, and wet-mixed base goods from rough ammoniates.
[6] Run-of-pile basis.

TABLE 4
WHOLESALE PRICES OF PLANT FOOD IN VARIOUS FRTTILIZER MATERIALS[1]

Calendar year	Nitrogen					P_2O_5, superphosphate		K_2O		
	Ammonium Sulphate	Ammonium Nitrate	Sodium Nitrate	Ammonia solutions	Natural organics[2]	Baltimore Ordinary	Baltimore Double[3]	Potassium Chloride	Potassium Sulphate	Manure salts
1920....	$4.08	.....	$4.44	.....	$8.71	$1.24	.....	$2.43	$3.41	.....
1925....	2.65	.....	3.28	.....	4.88	0.60	.....	0.58	.86	$0.48
1930....	1.79	.....	2.49	.....	4.50	.54	.....	.68	.97	.62
1935....	1.13	.....	1.47	$1.07	3.38	.49	$0.75	.42	.68	.44
1940....	1.37	.....	1.68	1.22	3.55	.52	.69	.52	.73	.57
1945....	1.42	$1.42	1.75	1.03	[4]	.65	79[5]	.54	.80	.68[5]

[1] Average prices per unit of 20 pounds of N, P_2O_5, or K_2O, as the case may be, at producing points or ports in bulk carlots.
[2] Average in castor pomace, process tankage, fish scrap, cottonseed meal, and animal tankage.
[3] The only available series of prices covering a period of years is for Baltimore, although Baltimore is not a producing point at present.
[4] More than $5.00.
[5] Estimated.

Fiscal Year Tag Sales Reach New High Peak

The close of the fiscal year on June 30, 1947, marked a new high point for the sale of fertilizer tax tags in sixteen States, according to reports of the State control officials of those States to The National Fertilizer Association. The ever-increasing demand for fertilizer, for this is the ninth consecutive time in which fiscal year sales have increased, shows that farmers are more and more aware of the value of properly applied fertilizer for better crops with greater profit.

Tag sales for the 1946–1947 fiscal year amounted to 9,078,000 equivalent short tons. This represented an increase of 8 per cent over the 8,367,000 tons reported for the 1945–1946 fiscal year, when fiscal year sales had reached the previous all-time high. Sales were 20 per cent higher than the 7,591,000 tons reported for 1944–1945 and were 82 per cent higher than the annual average of 4,995,000 tons for the fiscal years 1935–1936 through 1939–1940.

The table shows that fiscal year tag sales have increased for both the South and the Midwest. Compared with the preceding fiscal year, 1946–1947 sales in the eleven Southern States increased 6 per cent; Georgia, Florida, and Alabama showed decreases of 1 to 2 per cent while the remaining eight States registered increases ranging from 3 per cent for Louisiana to 88 per cent for Oklahoma. Fisca year sales for the eleven Southern States, amounting to 7,311,000 tons, were 63 per cent greater than the yearly average of 4,488,000 for the years 1935–1936 through 1939–1940. June 30, 1947, also marked the seventh consecutive time in which fiscal year sales have increased for the eleven Southern States.

July–June tag sales in the five Midwestern States amounted to 1,767,000 tons, an increase of 22 per cent over the previous fiscal year. Compared with 1945–1946, each of the five States reported an increase; sales in Missouri increased 14 per cent, Indiana and Kentucky recorded 18 per cent increases, Illinois was up 27 per cent, and Kansas increased 128 per cent. The great increase in the Midwest during recent years in the use of fertilizer is evident when the sale of 1,767,000 equivalent tons is compared with the annual average of 506,000 for the fiscal years 1935–1936 through 1939–1940; the increase amounts to 249 per cent. Another indication of the increasing widespread use of fertilizer in the Midwestern States is the fact that fiscal year tag sales in those five States have increased for the eighth consecutive year.

One significant factor in the sale of fertilizer tax tags is the percentage of total sales in the two six-month periods, July–December and January–June. Years ago the farmers purchased almost all of their fertilizer as they needed it. The small percentage of fertilizer that was bought in the July–December period was used almost entirely by farmers in the winter wheat belt and in the extreme

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FERTILIZER TAX TAG SALES—Short Tons
Compiled by The National Fertilizer Association

State	July–June 1941–42	1942–43	1943–44	1944–45	1945–46	1946–47
Virginia	416,231	423,574	497,911	574,094	637,063	672,240
North Carolina	1,194,175	1,292,655	1,384,789	1,466,472	1,544,779	1,653,069
South Carolina	659,412	802,498	813,548	834,985	822,293	894,354
Georgia	788,111	988,191	1,062,629	1,079,056	1,131,587	1,111,314
Florida	630,264	624,602	794,600	813,940	985,653	970,230
Alabama	571,350	640,200	707,400	735,600	794,950	778,700
Tennessee	163,064	214,723	246,362	295,463	284,336	337,037
Arkansas	140,950	153,583	139,873	131,250	145,050	188,530
Louisiana	168,986	181,443	205,110	209,701	243,535	250,587
Texas	133,608	153,881	193,976	215,218	288,825	381,877
Oklahoma	11,386	16,494	17,586	25,969	38,958	73,237
Total South	4,877,537	5,491,844	6,063,784	6,381,748	6,917,029	7,311,175
Indiana	342,355	431,714	474,084	498,081	610,539	718,654
Illinois	78,838	86,905	141,031	231,274	280,333	356,370
Kentucky	140,736	144,952	230,872	282,217	294,312	348,674
Missouri	86,511	78,783	127,065	161,333	229,779	262,639
Kansas	19,910	8,413	36,535	35,885	35,507	80,899
Total Midwest	668,350	750,767	1,009,587	1,208,790	1,450,470	1,767,236
Grand Total	5,545,887	6,242,611	7,073,371	7,590,538	8,367,499	9,078,411

Minimum Grades and Higher Analyses*

By MAURICE H. LOCKWOOD

President, The National Fertilizer Association, Washington, D. C.

PROGRESS upward in the analysis of mixed fertilizers in South Carolina has been substantial in recent years. For this progress public officials here at the Clemson Agricultural College and industry members distributing in this State are to be commended. We should not, however, rest on our laurels with present accomplishments. All of us connected with fertilizer production, distribution and control should continue the good work. As an indication of the favorable trend, we have tabulated below the six leading grades of mixed fertilizer in this State for three years ended on June 30, 1934, 1945 and 1946. These tables indicate that in the year ended June 30, 1946, only one of the six leading grades contains less than 20 units of the three major nutrients; that is the 3–9–6 which is in third place for that year.

The first grade numeral for 1934 grades indicates ammonia (NH_3). For the later years the first figure indicates nitrogen.

TABLE I

SOUTH CAROLINA

1934

Grade	Tons
3–8–3	128,339
4–8–4	46,490
5–7–5	28,026
4–10–4	19,198
3–8–5	8,523
2.5–8–1	7,034
Total of 6 grades	237,610
Per cent of total mixtures	89%
Total mixtures	267,408

TABLE 2

SOUTH CAROLINA

Grade	1945 Tons	1946 Tons
4–10–6	173,141	257,122
3–9–9	115,503	104,361
3–9–6	55,984	93,137
5–10–5	68,592	85,684
3–12–6	38,303	53,972
4–8–8	42,922	38,400
Total of 6 grades	494,445	632,676
Per cent of total mixtures	92%	94%
Total mixtures	538,373	672,535

*An address before the Fertilizer Conference, Clemson Agricultural College, S. C., July 16, 1947.

We should not rest on our laurels on such progress for several reasons. Among these is the fact that concentration of materials has increased markedly and the use of dilute organic nitrogen carriers has decreased substantially. There may also well be asked the question whether we should continue to use in mixed fertilizers any substantial quantity of limestone to neutralize the acidity created by nitrogen carriers. Certainly it is less expensive for users to purchase liming materials separately rather than in mixed fertilizers.

In order to indicate to you the basic policy of The National Fertilizer Association on higher analysis fertilizers, I quote the policy statement on this point adopted by the Association Board of Directors some time ago:

"The National Fertilizer Association restates its long-continued endorsement of the manufacture of fertilizers containing as high proportion of plant-food content as is consistent with progress in the art of farming and with the farmers' enonomic welfare. The National Fertilizer Association pledges a continuation of its policy of close cooperation with State and Federal agronomists and soil chemists in the development of this objective. Grades of medium concentration of plant food are economically justifiable only to the extent of conserving agronomically valuable raw materials of natural or by-product origin which cannot practicably be concentrated."

With the current heavy demand for fertilizers it may seem easier to postpone further increases in concentration until supplies more nearly catch up with demand. I do not think that this is the correct procedure. A balance of supply and demand will certainly occur within the next few years. Our best preparation for that day is to have our programs anticipate that condition. I therefore recommend that units of the industry operating in South Carolina inventory carefully their grade lists. From studying the approved grades and ratios listed by Clemson Agricultural College there are plenty in the list from which to select. The easiest ob-

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Principal Articles in This Issue

Allocation of Nitrogen Exports Announced

Procedures designed to assure export of specified quantities of nitrogenous fertilizer materials to designated foreign countries have been established by the Office of Materials Distribution, Department of Commerce. The countries to receive these materials and the quantities of nitrogen to be exported from the United States were recommended in June by the International Emergency Food Council, and agreed to by the U. S. Government.

OMD has issued Direction 4 to its Allocation Regulation 2, making provision for an export symbol (CXN), to be used on certified export orders for nitrogenous fertilizers containing up to the 57,860 tons of nitrogen which the United States is committed to sell abroad. This certification will have the force and effect of a priority rating, and orders bearing it must be accepted and shipped by producers.

Equitable distribution among producers of the export quota to which the United States is committed is provided for by placing a ceiling on the rated orders each is required to accept. Unless otherwise directed by OMD, no producer need accept orders which would call for more than the following percentages of his 1946–1947 production of nitrogenous fertilizers:

Ammonium Sulphate	9%
Ammonium Nitrate	16%
Ammonium Phosphate	42%
All other nitrogenous solids	4%
All nitrogenous solutions	2%

To protect U. S. users during the peak of domestic demand, the Direction also requires that all certified export orders be placed before October 31, 1947, and that no export order may call for delivery, after January 1, 1948, of more than 40 per cent of each type of nitrogenous fertilizer covered by it.

Requests for permission to use the CXN symbol to obtain nitrogenous fertilizers may be made by letter to the Export Control Branch, Office of International Trade, Department of Commerce, Washington 25, D. C. Advice as to the conditions under which such requests will be approved, and the amounts recommended for export by the International Emergency Food Council and agreed to by the United States, may be obtained from that office. Authority to use the CXN symbol will be granted only when an export license also is granted.

In addition to an estimated domestic pro-

duction of 686,000 tons, the United States during the coming twelve months will import approximately 187,000 tons of nitrogen, virtually all of it from Chile and Canada. The ratio of U. S. imports to exports (57,860 tons) under international commitments, is, therefore, more than three to one.

Lion Shipping Nitrogen Solutions

The Lion Oil Company shipped its first car of solutions for manufacturing fertilizers from its chemical plant at El Dorado, Ark., July 1, 1947. This is another step by this progressive company in bringing to the fertilizer industry and farmers of the South low cost nitrogen.

In May, 1946, Lion began shipments of grained Ammonium Nitrate Fertilizer. In the area they serve, nitrogen from Ammonium Nitrate Fertilizer is lower in price than nitrogen in any other available solid form.

Lion in continuance of this policy to service the South with low cost nitrogen has added fertilizer solutions to its production program. This material will deliver on present price basis in most of the South at a lower cost than the prices previously prevailing in this territory.

Angier Appointed Manager of American Fertilizer Chicago Office

Nedom L. Angier, Jr., has been appointed Manager of the Chicago Office of Ware Brothers Company, publishers of THE AMERICAN FERTILIZER, THE NATIONAL COUNTY AGENT AND VO-AG TEACHER, and ATLANTIC FARM AND HOME DEALER.

Mr. Angier was formerly Editor and Business Manager of Walter W. Brown Publishing Company in Atlanta and later was Manager of the Chicago Office of the same concern. He has been connected with the trade publishing field for the past eight years and has a thorough knowledge of the problems of the fertilizer industry.

His offices are located at 111 W. Jackson Boulevard, Chicago 4, Ill., and all members of the fertilizer industry are invited to stop in when in Chicago.

Lush Receives Professorship at University of Tennessee

Robert H. Lush, pasture specialist of The National Fertilizer Association, has been appointed Professor of Dairying and Animal Husbandry at the University of Tennessee and the Tennessee Agricultural Experiment Station at Knoxville, Tenn. In the eight years that Professor Lush has headed the Association's pasture research work, he has seen this branch of the fertilizer industry grow from a position of relatively minor importance to one of the major branches of fertilizer consumption. His many friends in the industry will be glad to learn of his appointment to this important post in the field of agricultural science.

Boreham Appointed Hough Service Manager

Appointment of Charles R. Boreham as Parts and Service Manager was announced recently by the Frank G. Hough Company, Libertyville, Ill., manufacturers of road building and fertilizer material handling equipment.

For the past two years, Mr. Boreham has been with the company working in assembly, production control, shipping and receiving which gives him an excellent background for his new appointment. He will now be in charge of part sales and will supervise the servicing of Hough Payloaders and Loader and Sweeper Attachments for Industrial Tractors.

Chase Names G. K. Whyte St. Louis Sales Manager

From the Chicago General Sales Office of the Chase Bag Company, R. N. Conners, Vice-President and General Sales Manager, announces that G. K. Whyte, who for the past several years has been connected with the Chase St. Louis Sales Department, will assume the duties of Sales Manager of the St. Louis branch.

Having represented Chase since shortly after his graduation from the University of Illinois, Mr. Whyte has gained a thorough knowledge of the bag business and packaging problems of Midwestern industries.

In accepting his new appointmen , Mr. Whyte expressed his enthusiasm of increased production afforded by the newly erected Chase Bag factory in St. Louis.

Superphosphate Increases Yield of Alfalfa in Texas

In an experiment at the Iowa Park (Texas) station, in the Wichita irrigated valley in 1946, the application of 400 pounds of superphosphate per acre increased the yield of alfalfa 1.9 tons per acre. This increase was worth $51.35 per acre above the cost of the fertilizer.

The experiment was started in the fall of 1944. The 20 per cent superphosphate was applied broadcast on the surface of the soil at the rates of 200, 400 and 800 pounds per acre. Then the land was plowed to incorporate the phosphate with the soil. After a good firm, smooth seedbed was prepared, alfalfa was seeded.

YIELD OF ALFALFA AND PROFIT FROM THE USE OF SUPERPHOSPHATE

Pounds of superphosphate per acre	Yield, tons per acre	Profit from using superphosphate
None	5.3	
200	6.5	$33.17
400	7.2	51.35
800	7.3	48.69

The superphosphate had no noticeable effect on yield of alfalfa in 1945. In 1946, however, striking increases in yield were obtained as shown in the Table. The yield of alfalfa increased as the amount of superphosphate was increased. Considering yield and cost of superphosphate, however, the use of 400 pounds of superphosphate per acre made the largest net returns above the cost of fertilizer, $51.35. The superphosphate cost $28.27 a ton and the selling price of alfalfa was $30 a ton.

June Tag Sales

Tag sales for June, amounting to 340,000 equivalent short tons, were 11 per cent greater than the 308,000 tons reported for last June and 39 per cent greater than for June, 1945. Sales in the eleven Southern States totaled 260,000 tons, an increase of 7 per cent over the preceding June and 60 per cent over two years ago. Of the eleven States, only five reported increases over the preceding June, but these increases were more than enough to offset the decreases in the remaining six States; Louisiana reported the greatest increase, amounting to 217 per cent, while Oklahoma recorded the greatest decrease. June sales in the five Midwestern States increased 22 per cent over a year ago, with only Kansas failing to register an increase.

January–June tag sales for the sixteen States, amounting to 5,740,000 tons, were 3 per cent below sales for the same period last year. Sales for January–June in the eleven Southern States amounted to 4,775,000 tons, a decrease of 6 per cent from the same period last year but a slight increase over January–June, 1945. The five Midwestern States, with January–June sales amounting to 967,000 tons, recorded a 12 per cent increase over the same period last year; all of these States except Missouri recorded gains over January–June of 1946.

FERTILIZER TAX TAG SALES*

Compiled by The National Fertilizer Association

State	June 1947 Tons	June 1946 Tons	June 1945 Tons	% of 1946	January–June 1947 Tons	January–June 1946 Tons	January–June 1945 Tons
Virginia	25,013	15,420	21,076	101	432,499	429,696	387,462
North Carolina	61,425	28,117	23,995	95	1,126,635	1,180,148	1,147,382
South Carolina	31,048	16,553	14,357	92	604,247	653,443	654,025
Georgia	32,947	35,850	25,395	97	879,477	903,848	877,825
Florida	46,600	62,240	40,026	82	428,110	518,953	441,951
Alabama	29,000	39,600	11,650	82	557,800	677,750	605,300
Tennessee	8,565	19,763	11,184	103	235,427	229,655	222,409
Arkansas	2,230	4,000	2,500	115	133,830	116,550	98,150
Louisiana	8,900	2,805	2,600	94	122,630	130,311	126,336
Texas	13,641	12,341	7,850	102	210,017	205,082	146,085
Oklahoma	500	5,200	1,450	148	44,792	30,298	16,412
Total South	259,869	241,889	162,083	94	4,775,464	5,075,734	4,723,337
Indiana	45,449	37,779	50,575	112	327,021	290,733	228,489
Illinois	8,150	6,600	7,800	127	210,275	165,508	142,189
Kentucky	11,100	9,140	13,650	109	250,154	230,361	218,183
Missouri	13,904	9,611	4,111	89	141,661	159,753	89,998
Kansas	1,760	2,620	7,000	207	37,773	18,227	20,865
Total Midwest	80,363	65,750	83,136	112	966,884	864,582	699,724
Grand Total	340,232	307,639	245,219	97	5,742,348	5,940,316	5,423,061

FERTILIZER MATERIALS MARKET

NEW YORK

Seasonal Lull Felt in Demand for Spot Materials. Nitrate of Soda Allocations to U. S. Increased 20 Per Cent for Coming Fertilizer Year. Phosphate Rock Prices Increased. Higher Rock Production Expected.

Exclusive Correspondence to "The American Fertilizer"

NEW YORK, August 4, 1947.

The usual summer lull in the fertilizer materials market is being felt this year, but with a difference. If the fertilizer manufacturer felt that there was any chance of getting additional orders for materials accepted, he would continue right on the job. However, having exhausted all present possibilities, he feels that he may as well take a vacation and see whether something may have developed by the time he gets back. Demand for spot materials has also slackened as fertilizer mixers are getting their plants in condition for the strenuous work which lies ahead this fall and winter.

Sulphate of Ammonia

The demand still tops supply, in spite of increased steel production and the settlement of the coal contract. Prices are quoted by producers in varying levels from $30.00 to $35.00 per ton, f.o.b. ovens, with the major trend toward the higher figure.

Nitrate of Soda

The world allocation of nitrate of soda from Chile has finally been announced by the International Emergency Food Council. The 92,800 metric tons of nitrogen from this source which has been allotted to the United States is equivalent to 102,000 short tons of nitrogen, or 637,500 tons of nitrate. This is about 20 per cent higher than the actual imports of 532,285 tons during the 1946–1947 season.

Organic Materials

Prices have gone up in some types of organics, particularly in feeding tankage, where some Western producers are asking $8.50 per unit of ammonia ($10.33 per unit N) but buyers are holding back at this price. Blood has been quoted at $7.25 per unit of ammonia ($8.82 per unit N), with buyers holding out for a price of $7.00.

Phosphate Rock

Miners are meeting with considerable success in increasing their output and new production facilities are expected to come into operation in the coming months. The demand still continues at high levels and is taking about all of the current production. Increased fuel and labor costs have caused Florida producers to raise prices about 35 to 40 cents per ton.

Superphosphate

Demand for spot material has declined somewhat but even this has not enabled the acidulators to catch up with current orders. To a much greater extent than usual, mixers have contracted for future supplies and some estimate that orders already placed exceed probable production for the fertilizer year ahead.

Potash

There is nothing new in the current potash situation. The producers have allocated practically their entire prospective production among their customers and could easily sell a much greater tonnage if it were available. Shipments against the new contracts are going forward on schedule.

There is no definite information as to what extent shortages in potash in this country may be taken care of by imports from Europe. The tonnage sent in from France this spring was a help but several times this amount could be used during the coming fertilizer year if it were available.

PHILADELPHIA

Demand for Delivery Exceeds Future Probable Production. Sulphate of Ammonium Prices Firming. More Superphosphate Expected.

Exclusive Correspondence to "The American Fertilizer"

PHILADELPHIA, July 31, 1947.

Buying for future continues, with inquiries for quantities much in excess of production. Organics are in considerably stronger position due to increased feeding demand, and the supply position of most fertilizer materials remains rather tight.

Sulphate of Ammonia.—It is said the price of $35.00 per ton, f.o.b. ovens, will become general August 1st. Production has increased, but not sufficient to keep pace with the demand.

Nitrate of Soda.—Demand continues strong and the trade awaits announcement concerning tonnage available for import during the coming season. Early arrival from Chile of 1,000 tons is awaited in New York area, and 2,500 tons in the South—to complete last season's apportionment.

Castor Pomace.—There is good demand, but movement is restricted to existing contracts.

Blood, Tankage, Bone.—These packinghouse by-products are finding a fairly ready outlet with the feeding trade, and at advanced prices. Tankage is quoted at $7.75 to $8.00 ($9 42 to $9 72 per unit N), with blood at $7.25 per unit of ammonia ($8.81 per unit N) per ton. Some blood sold as low as $7.00 ($8.51 per unit N) per unit of ammonia during the past week. Bone showed more activity, but practically no change in price

Fish Scrap.—Production has increased due to favorable catch, and the market is in better supply position. Interest, however, is entirely with the feeding trade. Sixty per cent scrap is quoted $110.00 to $115.00 per ton at the plant, with meal $120.00 to $125.00 per ton.

Phosphate Rock.—Demand continues strong and buying position is tight. No accumulation of inventories seems possible.

Superphosphate.—Present market is tight and firm, with most interest in futures, but present increased production is expected soon to ease the supply position.

Potash.—While considerable potash has been sold on contract, the demand for increased quantities is still very persistent. There is strong inquiry for by-products and substitutes.

CHICAGO

Summer Lull in Organics Market. Producers Well Sold Up. Feed Market Reports Big Demand.

Exclusive Correspondence to "The American Fertilizer"

CHICAGO, August 2, 1947.

As is usual at this period, there is but little activity in the organic market. Buyers are not showing the heretofore keen attention to the situation while sellers report being well sold up.

In feeds, some of the large producers have raised their prices while others have not. All of them claim that the demand is very lively and orders are being received in greater tonnage than the present production.

TAG SALES REACH NEW PEAK

(Continued from page 10)

Southern truck areas who utilized the fertilizer on their fall plantings; very little of the fertilizer bought in the first half of the fiscal year was held over for use in the spring. In recent years, however, there has been a noticeable shift in the fertilizer buying habits of the American farmers. Under the urging of the Department of Agriculture and in cooperation with the fertilizer industry, the

farmers have been buying some of their fertilizer much earlier than previously, storing it for use in their spring plantings. This early buying has had the effect of assuring the purchaser of an adequate supply of fertilizer when he needs it and relieving the fertilizer industry of much of the congestion formerly experienced in delivering practically all of its output in a few short months.

Goals for Some 1948 Crops Announced

During the past few weeks, the U. S. Department of Agriculture has announced crop production goals for 1948 on several important crops, including wheat, rye, potatoes, peanuts and winter vegetables. The acreage specified was on a national basis. After review by State U. S. D. A. Councils, the allocations for individual States will be announced.

Wheat

The goal for wheat is 75 million planted acres, about the same as the 1947 indicated acreage, excluding volunteer wheat, but 8 per cent larger than the prewar 1937–1941 average. This would be the fourth largest wheat acreage farmers in this country have ever planted, being exceeded only in 1919, 1937, and 1938.

In announcing this goal, the Department said that under normal peacetime conditions a much smaller planted acreage of wheat would be desirable. Because the need for exports to meet world food shortages continues urgent, however, it appears desirable to maintain a high U. S. wheat acreage in 1948. Consideration was also given, in arriving at the desired goal, to the fact that this year's wet season may make more land in the Corn Belt available for seeding to wheat this fall.

State officials are being asked to review recommended goals carefully in the light of local conditions, and farmers in dry land areas are especially cautioned against plowing up sod lands not suited for sustained farming, or planting wheat on land that should lie fallow.

With an average yield of around 14.3 bushels per acre (the 1937–1946 average) the 1946 goal acreage would produce 1,070 million bushels. If yields should approximate the 1942–1946 average of 16.3 bushels, production from the goal acreage would be about 1,221 million bushels, and additional wheat would be available for export shipments and feed. Boosted by an average yield of 18.6 bushels per acre, this year's crop is indicated at 1,435,551,000 bushels, the largest U. S. wheat crop on record.

Rye

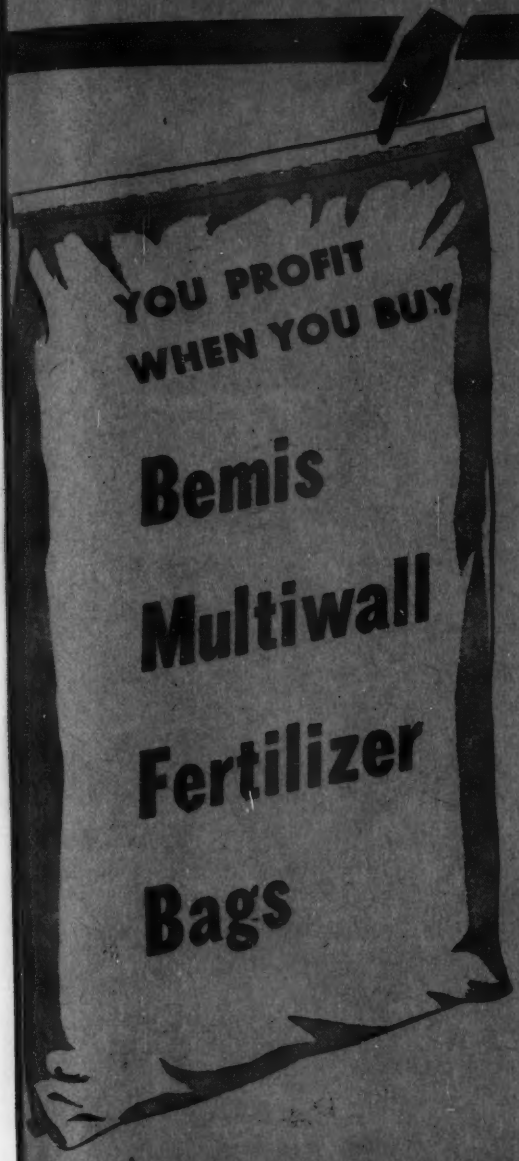
A rye goal of 2.3 million acres is proposed for harvest in 1948. This is 347,000 acres larger than the acreage indicated for harvest in 1947. Largely because of competition from other crops for available land, rye acreage has declined steadily for a number of years.

With average yields, rye production from the 1948 goal acreage would be about 27 million bushels, compared with this year's indicated production of a little over 25 million bushels. This would provide sufficient rye to meet essential domestic requirements. While some rye may be exported, the quantity probably will be small in view of the better supply position of other grains.

Potatoes

Requirements for potatoes during the 1948 crop year are expected to total 375 million bushels, close to the volume which moved into commercial channels from the record 1946 crop. The total potato goal for 1948 is, therefore, recommended at 2,370,000 acres, with a suggested commercial acreage of

4 Good Reasons Why...



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3. Bemis Multiwall Specialists are always at your service—ready to help you solve your packaging problems.

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1,512,100, the same as the 1947 commercial goal. "Commercial" acreage is defined as that on farms having three or more acres of potatoes.

Actual production in 1947, however, differs somewhat from the goal in that the early commercial potato crop was 10 million bushels above the goal, while the late crop, according to July 1st crop prospects, is likely to be less than the goal. Since the early crop is extremely perishable and cannot be kept in storage for use during the winter, local seasonal surpluses have occurred during late spring and summer.

Peanuts

The U. S. Department of Agriculture has announced the proclamation of a marketing quota of 760,000 tons of 1948-crop peanuts.

Action was taken as required by the Agricultural Adjustment Act of 1938, to proclaim marketing quotas unless the supply of peanuts for edible products and vegetable oils is below domestic requirements and probable exports.

The AA Act also requires that a referendum be held not later than December 15, 1947, in which the producers of peanuts may vote for or against marketing quotas. A two-thirds vote in favor of quotas would put marketing quotas and acreage allotments into effect for the next three years.

Also a price support on 1948-crop peanuts at 90 per cen of parity as of July 15th, the beginning of the marketing year, is contingent upon the growers' approval of the quotas proclaimed by the Secretary of Agriculture. Penalties would be assessed against marketings in excess of the established quotas.

The 760,000 tons of 1948-crop peanuts, proclaimed as a marketing quota, is based upon the actual disappearance of cleaned and shelled peanuts during the last five years and the prospective disappearance from the 1947 and 1948 crops.

With a determined normal yield of 654 pounds per acre during the five years 1942–1946, the 706,000 tons proclaimed as a marketing quota would mean a national acreage allotment of 2,324,159 acres. This would compare with an average af 3,243,000 acres picked and threshed during the 1942–1946 period.

Winter Vegetables

The U. S. Department of Agriculture has recommended for consideration by U. S. D. A. State Councils for Arizona, California

Increase the Nitrogen Content of Your Mixed Fertilizer and Lower Your Costs with

✓ **Extra Quality** for your fertilizer because Lion Nitrogen Solutions give you the means to use maximum amounts of both ammonia nitrogen and nitrate nitrogen.

✓ **Extra Nitrogen** for your fertilizer because Lion Nitrogen Solutions are more economical sources of nitrogen. Used properly, they give you fertilizers that cure rapidly, store well and drill efficiently.

✓ **Extra Profits** because Lion Nitrogen Solutions help you lower your handling costs. They supply in one operation the nitrogen usually added separately by several nitrogen carriers.

Lion "1" Is Available For Shipment In Tank-Car Lots *NOW*

Composition of Lion "1"
Ammonium Nitrate 65.0%
Anhydrous Ammonia 21.7%
Water 13.3%
Total Nitrogen—40.6%
Nitrate Nitrogen— 11.38%
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Nitrogen is an important sales feature of mixed fertilizers because more and more farmers realize the need for nitrogen as a soil food. Give your fertilizers the extra sales advantage of nitrogen with Lion Nitrogen Solutions.

You will find Lion Nitrogen Solutions an economical source of nitrogen for your mixed fertilizers. Lion "1," for example, contains 40.6% nitrogen—a higher content than most sources. It is easy to mix and does not reduce the effectiveness of other ingredients.

Write to Lion Oil Company, Chemical Division, El Dorado, Arkansas, for complete details *today*.

LION OIL COMPANY
CHEMICAL DIVISION

LION PETROLEUM PRODUCTS

EL DORADO, ARKANSAS

Florida, Louisiana, Oregon, Texas and Virginia an acreage for winter vegetables in 1948 three per cent below that planted for the 1947 winter season.

While the 291,945 acres recommended for the 17 winter vegetables is three per cent below the acreage recommended for 1947, it is five per cent above the 277,940 acres harvested in 1947. Some of last year's planted acreage was lost because of adverse weather conditions.

In 1947 production of winter vegetables was appreciably reduced by freeze damage. It totaled 1,270,400 tons, or 11 per cent below production in 1946. Acreages recommended this year, with average yields, would result in a production 6 per cent greater than in 1947 and 16 per cent more than average production for the last ten years.

Acreage increases for 1948 were recommended for lima beans, beets, lettuce and shallots, and reductions for snap beans, carrots, cauliflower, celery, escarole, kale, and green peppers. No acreage change was recommended for artichokes, cabbage, eggplant, peas, spinach, or tomatoes.

MINIMUM GRADES AND HIGHER ANALYSES

(Continued from page 11)

vious change that might be made now in this State is to replace the 3–9–6 grade with a somewhat more concentrated grade such as the 4–12–8. This is cited simply as an example of further progress which might well be made. I hope that members of the industry in this State will not limit their grade list revisions to that one. My reason for so suggesting is that even 20-unit minimums are soundly subject to further increases in some ratios.

You are urged to study and use to your advantage and to the advantage of fertilizer consumers you are serving a paper presented at Beltsville, Md., last January by Mr. K. D. Jacob of the U. S. D. A.'s Bureau of Plant Industry. That paper† is entitled "Development and Use of Fertilizer Materials in Relation to Higher Analysis Mixtures." The only point I shall stress now on that article is the substantial saving which is possible when the concentration of some ratios and grades is increased from 18 or 20 units to 24 or 25 units of nitrogen, phosphoric acid and potash. In still another paper presented at the Beltsville Conference by Drs. K. G. Clark and F. E. Bear, the authors show that there is a potential saving of about one-sixth

† Printed elsewhere in this issue.

H

P

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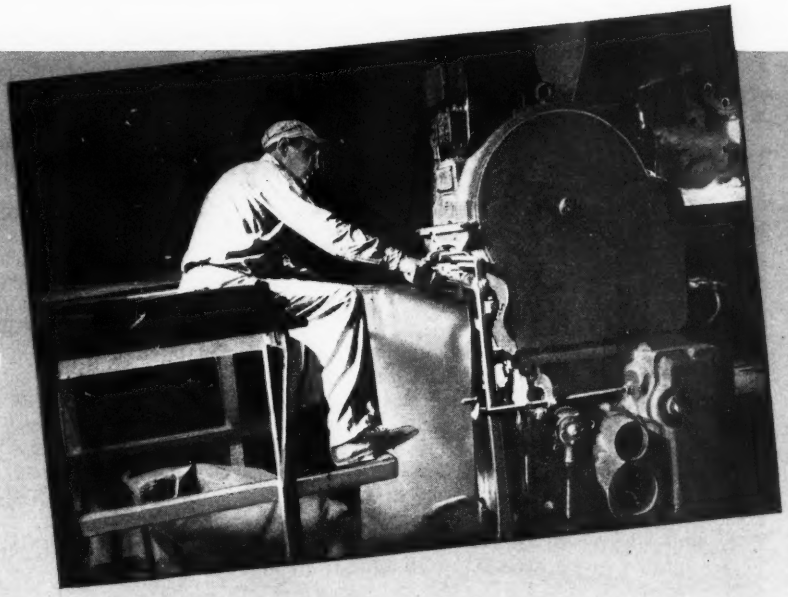

On a straight run of a single grade of fertilizer, an output as high as 36 tons per hour is common with a St. Regis 160-FB packer. Only *one operator* is required. The packer automatically fills and weighs the self-closing multiwall paper valve bags.

There are many other time- and cost-saving advantages. Plant workers like Multiwalls because they are easy to handle, clean and sift-proof. Customers and dealers like Multiwalls because special bag construction protects fertilizer against "caking" due to moisture-vapor penetration, and because they are clean and easy to handle.

Investigate all the advantages of this modern, low-cost packing method. Call or write the nearest St. Regis office.

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in increasing the concentration of a 1–3–2 ratio from a 3–9–6 grade to a 4–12–8.

During the period of the recent war our fertilizer industry and many others operated under many government orders which were justified under war conditions. Some of these orders involved minimum grades of mixed fertilizers for each of the several States. As a member of the Fertilizer Industry Advisory Committee which served with war agencies for the emergency period, I am glad that we had such regulations. Now that the war is over and we are well into the period of readjustment, however, I am certain that we can well return to the States and to the many good minds among our individual citizens the decisions on many of our affairs which for a time were largely centralized in our Nation's Capital. I therefore recommend particularly that members of the fertilizer industry assume again much of the initiative for further progress in soundly increasing the concentration of mixed fertilizers. In the Southeast this may not mean increasing mixtures to the same degree of concentration which will be sound in some areas more distant from base points of fertilizer production. The Northeast and the Midwest, as well as the West Coast, for instance, may possibly find it wise to increase the concentration of their mixed fertilizers more than may wisely be done here in South Carolina. That is because those areas are subject to longer transportation routes and therefore higher transportation costs of such items as phosphate rock or processed phosphat s.

In your studies of fertilizer grades for next year and the years beyond, I hope you will consider carefully and adopt steps to take advantage of other increases in concentration permitted under the ratios approved by Clemson Agricultural College. Other instances of possible increases which occur to me are 5–10–10 in place of 4–8–8; 4–12–12 in place of 3–9–9, and 6–12–6 in place of 5–10–5. I prophesy that those leaders of the fertilizer industry who do take such steps will find within the next few years that they were wise in stepping up the concentration of mixtures that they distribute for the mutual benefit of the fertilizer users they are serving and themselves.

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Of the more than sixty major industries we serve none have more efficient heavy packaging than the chemical industry. Generally the industry's bags are quite uniform . . . production lines well planned . . . sacking scales well fitted to the operation. In fact the EXACT WEIGHT Sacking Scales (illustrated) are the result of years of field tests from bagholders to weighing elements. This equipment built to the following specifications (1) dependability, (2) adaptability, (3) simple construction, (4) speed of operation, (5) toughness, (6) accuracy are used today by the leaders of the industry. Bought year after year these scales go into many new operations . . . for replacement time after time in one plant after another . . . proof we believe of their worth. Write for complete details.

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FERTILIZER MATERIALS IN HIGH-ANALYSIS MIXTURES

(Continued from page 9)

either P_2O_5 or K_2O, the subsequent sharp decrease in the price of this type of nitrogen has been a very important factor in lowering the cost of fertilizers.

Assuming equal value in crop production, there are certain relationships between the cost and concentration of plant-food materials and their patterns of use which should be borne in mind. With respect to the commonly used materials, three general cases covering some of these relationships may be cited:

Case 1. Materials of high analysis and low cost per unit of plant food. There is great incentive for the use of such materials, for example, potassium chloride and the ammoniating solutions, and they should be employed to the fullest possible extent.

Case 2. Materials of high analysis and high unit cost. As the incentive for the use of this class of materials is less than that for materials of Case 1, their chemical and physical properties, or their special adaptability for certain crops, may be the deciding factor in their use. Examples of such materials are potassium sulphate and, in some parts of the country, double superphosphate.

Case 3. Materials of low analysis and high unit cost. Except for special purposes or under limited conditions, such materials, for example, natural organics and manure salts, are generally uneconomical sources of plant food and their use in mixed fertilizers should be discontinued.

Nitrogen Materials

The distribution of the nitrogen consumption among the various materials for the period 1900 to 1945 is shown in Fig. 1. The outstanding feature of the nitrogen picture has been the continuous and very marked decrease in the use of the low-analysis, high-cost natural organics. Such materials supplied 89 per cent of the commercial fertilizer nitrogen in 1900 but only 5 per cent in 1945. The various factors in the use of natural organics will be fully discussed in the subsequent paper by Clark and Bear.

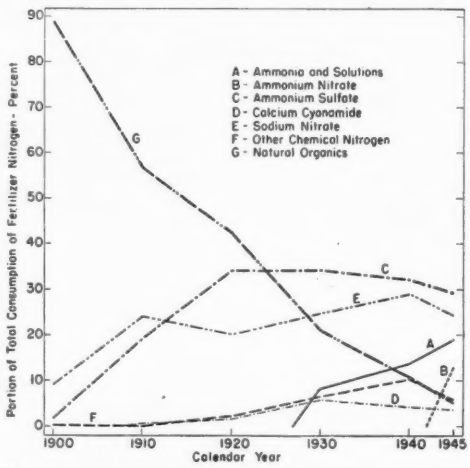

Fig. 1. Distribution of Nitrogen Consumption Among the Various Materials

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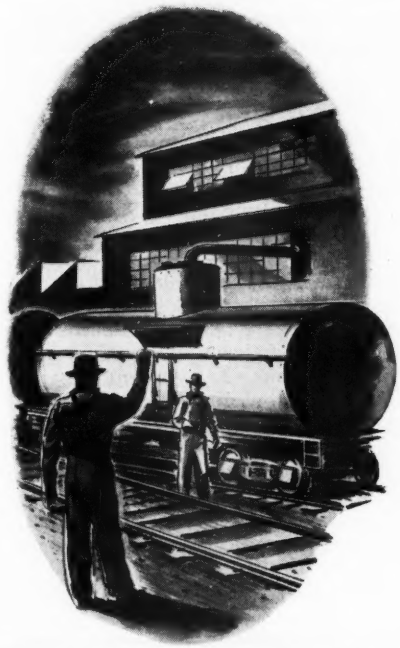
COMPOSITION OF SPENSOL (SPENCER NITROGEN SOLUTIONS)						
	Ammonium Nitrate %	Anhydrous Ammonia %	Water %	Total Nitrogen %	Nitrate Nitrogen %	Ammonia Nitrogen %
SPENSOL A	65.0	21.7	13.3	40.6	11.36	29.24
SPENSOL B	55.5	26.0	18.5	40.8	9.62	31.18
SPENSOL C	66.8	16.6	16.6	37.0	11.65	25.35

LOOK! New SPENSOL

SPENCER NITROGEN SOLUTIONS

UP TO 40.8% NITROGEN CONTENT

EASIER TO MIX AT LOWER COST!



High nitrogen content in mixed fertilizers goes hand in hand with high sales volume. In new Spensol (Spencer Nitrogen Solutions) you get up to 40.8% total nitrogen, properly balanced with other vital materials, to manufacture your well-conditioned, profitable fertilizer.

MORE NITROGEN PER DOLLAR

The high nitrogen content of New Spensol nitrogen solutions makes Spensol your new, economical source for efficient, more profitable mixing. (See chart above).

HIGHER NITROGEN CONTENT

The high nitrogen content of Spensol makes possible the manufacture of high nitrogen complete fertilizers, now so much in demand.

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Spensol is easy to mix and facilitates the preparation of a clean, non-caking fertilizer that cures more quickly.

IMMEDIATE AVAILABILITY

Spensol is ready for shipment to you in tank car lots direct from Spencer Chemical Company's Jayhawk Works, centrally-located at Pittsburg, Kansas. Our technical advisory staff is at your service, without charge.

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SPENCER

MANUFACTURERS OF HI-NITROGEN FERTILIZER PRODUCTS

In the last 25 years, about 20 to 30 per cent of the fertilizer nitrogen has been derived from sodium nitrate, which among the chemical nitrogen materials is the highest in cost and the lowest in plant-food content (16 per cent N). In the same period, low-cost ammonium sulphate (20.7 per cent N) supplied about 30 to 35 per cent of the nitrogen. Sodium nitrate, derived principally from the natural deposits in Chile, is used mostly for direct application as a top-dressing material. On the other hand, ammonium sulphate, which in this country is obtained almost entirely as a by-product of the coke industry, is a very desirable material for use in mixed fertilizers because of its excellent physical and chemical properties.

Since 1930 important and increasingly large quantities of nitrogen in the form of aqueous solutions of ammonia and ammonium nitrate or urea have been used. These solutions, commonly called ammoniating solutions, have the advantage of high concentration (37.0 to 45.5 per cent N) and next to anhydrous ammonia (82 per cent N) they are the cheapest sources of nitrogen for the fertilizer industry. They have, however, the disadvantage that their possible use in mixed fertilizers is in direct proportion to the quantity of superphosphate present in the mixture, and usually only a portion of the total nitrogen of a mixture can be derived from such sources. Ammoniating solutions, together with limited quantities of ammonia liquor and anhydrous ammonia, furnished 19.0% of the total fertilizer nitrogen in 1945, as compared with only 8% in 1930.

Nearly pure, solid ammonium nitrate suitable for use as fertilizer, which first appeared on the market in 1943, accounted for 13 per cent of the total consumption of nitrogen in 1945. Its nitrogen content (32.5 to 33.5 per cent) is about 60 per cent higher than that of ammonium sulphate, but is priced the same ($1.42 per unit). Unfortunately, ammonium nitrate absorbs moisture so readily that it can be used to supply only a portion of the nitrogen in most mixed fertilizers as currently processed and shipped. It appears, however, that the material might be used satisfactorily as the sole source of nitrogen in granular high-analysis mixtures that are packaged in moisture-proof containers.

Calcium cyanamide, ammonium phosphates, and urea are minor sources of nitrogen for domestic agriculture, and it seems unlikely that cyanamide production will be materially increased. The high concentration (36 to 60 per cent N and P_2O_5) and the desirable physical characteristics of the ammonium phosphates, together with the current low cost of anhydrous ammonia ($59 per ton), have caused renewed interest in their production. A new plant for the manufacture of fertilizer-grade ammonium phosphates was placed in operation in 1946; this is the first domestic production of such material in about six years.

While urea (42 per cent N) is the most concentrated of the solid nitrogen fertilizer materials it, like ammonium nitrate, suffers from the disadvantage of producing poor physical condition when it is used in mixed fertilizers in large quantities. Urea for fertilizer is currently priced to compete with ammonium nitrate, but it brings somewhat higher prices for technical purposes and for use as a source of nitrogen in feeds for cattle and other ruminants. This situation and the limited supply have caused the material to remain a minor source of fertilizer nitrogen. Even though the production capacity (all in one plant) is in course of expansion, the future of urea as a fertilizer material appears to be quite uncertain.

In the year ended June 30, 1945, the total quantity of nitrogen used in mixed fertilizers amounted to 334,700 tons, of which chemical nitrogen accounted for some 308,000 tons, or 92 per cent. The chemical nitrogen was distributed among the different materials approximately as follows: ammonia and ammoniating solutions, 29 per cent; nearly pure, solid ammonium nitrate, 9 per cent; ammonium sulphate, 52 per cent, and other chemical materials, 10 per cent. None of the high-analysis materials was higher in unit cost than ammonium sulphate—the standard source of nitrogen in the mixtures—and, except for the natural organics, virtually no premium sources of nitrogen were used.

(To be continued in the next issue)

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Commercial Solvents Corp., New York City
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Utility Works, The, East Point, Ga.

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Longview-Saginaw Lime Works, Inc.., Birmingham, Ala,
McIver & Son, Alex. M., Charleston, S. C.

LOADERS—Car and Wagon
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Sturtevant Mill Company, Boston ,Mass

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